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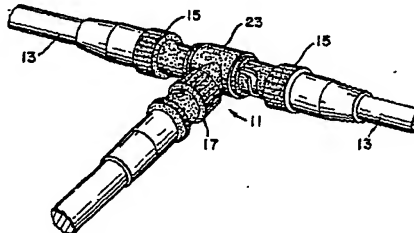
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(54) **Selectively insulated coaxial connector.**

(57) The invention resides in a T-shaped coaxial BNC-type connector which includes a conductive housing which is connected to shields for coaxial cable for shielding conductors in the cable. The connector housing is selectively coated with an insulative material so that when employed in a connector assembly in assembled form, inadvertent separate external grounds which may disrupt the shield are avoided.



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SELECTIVELY INSULATED COAXIAL CONNECTORBackground of the Invention

This invention relates to coaxial connectors and more particularly, to selectively insulated coaxial connector housings.

5 Present day computer terminals are typically interconnected by means of coaxial cable for transmitting and receiving information to and from, for example, main frame computers, or other terminals. Typically, the  
10 interconnections are effected by means of shielded coaxial cables which are connected at terminals thereof by T-shaped shielded coaxial connectors, typically of the BNC-type as well known to those of ordinary skill in the art.

15 As also well known, such coaxial connectors are often subject to interference especially when terminals are exposed and disposed adjacent electrical equipment, power lines or metal walls which affect signals being transmitted through the coaxial cable. Moreover, while  
20 providing a shielding effect, the outer housing of the connector while grounded to the shields of the coaxial cable and/or other like shielding elements, are often subject to contact with a separate external ground which can result in a ground loop which will in turn  
25 detrimentally affect signals being transmitted through the coaxial cable by disrupting the shielding.

In the past, one attempt to avoid these problems has been to insulatively isolate the T-shaped coaxial connectors, for example, by use of a cover boot such as  
30 is disclosed in U.S. Patent 4,538,869. While generally serving satisfactorily for ensuring that the T-shaped coaxial connector, preferably a BNC-type connector is held in a fixed position and prevented from establishing external separate grounds different from the grounding  
35 to the shields of the coaxial cable, such boots are typically cumbersome to use and oftentimes, due to the fact that it is a separate element which is enclosed about the T-shaped connector, it is often the case that

the user of a computer system will forget to place the boot thereon, thereby exposing the connection to the risk which the boot is intended to avoid. Accordingly, in accordance with the invention, a coaxial connector is provided which does not require the use of separate elements to ensure against extraneous grounds occurring while at the same time avoids such extraneous grounds from being established in use in a computer system.

#### SUMMARY OF THE INVENTION

In accordance with the invention, there is provided an improvement in a coaxial connector, in one aspect a T-shaped coaxial connector of the type having a conductive outer housing for grounding the outer housing to provide shielding for conductors interconnected by the connector. Typically, such conductors are in the form of shielded coaxial cables of the type well known to those of ordinary skill in the art which have shielding braids to which the shielding outer housing of coaxial connectors are connected to maintain shielding. The improvement resides in that the connector is selectively coated on at least a portion of the outer housing thereof, which is exposed in an assembled state, with a non-conductive material for preventing inadvertent electrical contact with other systems or earth grounds, whereby undesired ground loops are avoided thereby preserving the integrity of communications being transmitted through coaxial cables interconnected by the connectors.

In another aspect, the coating is provided of a thickness sufficient to provide electrical insulation. Typically, the coating is of the type which has been deposited by conventional electrostatic spraying and subsequent heat curing. More preferably, the coating is one of a plastic material or an insulative epoxy material. Even more preferably, the coating is one of nylon, tetrafluoroethylene polymer or rubber coating.

In still another aspect the connector comprises a female connector portion leading into a dual male

connecting portion off of a T wherein the coating is selectively applied only to the outer surfaces of the female connecting portion and other portions of the connection which are exposed when all portions of the connector are in a connected condition to other elements such as coaxial cables. In a still more preferred aspect, the connector is a BNC-type connector.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Having briefly described the invention, the same will become better understood from the following detailed discussion taken in conjunction with the appended drawings wherein:

Figures 1-3 show sequentially a prior art structure employed with a conventional BNC coaxial T-shaped connector shown being assembled about the connector which includes cables connected thereto for the purpose of providing an insulative cover to the conductive shielding outer housing of the BNC connector;

Figure 4a shows in perspective view a preferred embodiment of a T-shaped connector housing in accordance with the invention;

Figure 4b shows in perspective view preferred embodiment of a cable terminating BNC-type connector assembled to a cable, in accordance with the invention; and

Figure 5 shows in perspective view the preferred embodiment of the connector housing in accordance with the invention shown with the BNC connector connected to three coaxial cables, and wherein the connectors or terminating BNC portions of the coaxial cable are modified as in Figure 4b to be compatible with the features of the invention as shown in Figure 4a to provide the resultant advantages thereof.

#### DETAILED DISCUSSION OF THE INVENTION

As discussed previously, Figures 1-3 show the prior art means for preventing shielding coaxial connectors, including T-shaped connectors, and especially BNC-type connectors, which include a conductive housing, from

being connected to a separate external ground which would disrupt the shielding effect provided thereby. This means, as shown, generally comprises a two-part housing 1 including an upper part 5 and a lower part 3 configured for receiving and holding the connector 11 therein. The housing includes a connector support portion 7 which secures the connector within the housing 1. Typically, as shown in Figure 2, the connector is then connected at two female portions or jacks 19 including engaging lugs 21 to male receiving BNC-type connector portions or plugs 15 which are connected respectively for terminating corresponding coaxial cables 13. Likewise, the male portion or plug 17 of the BNC-type T-shaped connector is engaged to a female connector or jack portion which is attached for terminating a like coaxial cable 13. Once the connections are established, the housing is closed upon itself and the top and bottom parts 5 and 3 engaged together by means of latch 9 generally shown in the drawings to be placed in a closed configuration as shown in Figure 3.

Although generally avoiding inadvertent external grounds from being established with the connector housing 11 and which disrupt shielding, the prior art boot 1 which is typically made of an insulative material is generally cumbersome to use, and it is often the case that the user forgets to place it on the connector 11 once the unit is assembled.

In accordance with the invention as shown in Figure 4, the requirement of a separate housing 1 as taught in the prior art, and of which Figures 1-3 are illustrative of the boot or housing disclosed in U.S. Patent 4,538,869 to Richards which has been previously discussed, is avoided.

More particularly, the connector housing 11 and 15 as shown in Figures 4a and 4b in accordance with the invention is selectively coated at a region 23, in the case of Figure 4a, with an insulative material. More

particularly, preferably as shown in Figure 4a, the insulative material region 23 encompasses the male connector portion or plug 17 of the BNC-type connector 11 as well as the middle of the T which leads into the two female portions or jacks 19 which include engaging lugs 21.

As shown in Figure 5, when assembled to three coaxial cables 13, the female connector portions or jacks 19 will be engaged to the male terminating BNC-type connector plugs 15 for the cables 13 which are shown in Figure 4b, and which as modified for use with the invention are also selectively coated with a non-conductive material on the exposed portions as illustrated. The non-exposed portions are connected to the cable 13 braid to maintain shielding and are not coated with the insulative material. As shown in Figure 5, the entire assembly then has the exposed connector housing parts completely coated with insulative material so that inadvertent separate external grounds disrupting the shielding are avoided.

With respect to the details of the interior of the T-shaped connectors themselves as well as the terminating connector assemblies, these are conventional in nature as will be readily apparent to those of ordinary skill in the art and are generally identified as BNC-type connectors and connector assemblies. With respect to the coating itself, this is typically applied by conventional spraying, preferably highly charged electrostatic spraying method as well known to those of ordinary skill in the art with a subsequent curing in an oven. The connector housing 11 is masked prior to spraying and then the spraying is conducted. As noted, such spraying is well known to those of ordinary skill in the art of plastic coating technology, and the thickness of the coating need be only sufficient to provide the necessary insulative effect, typically 1-2 mils.

With respect to the materials employed to provide

the coating, these can be a number of materials among which are included tetrafluoroethylene polymer commercially available under the trade name Teflon, other plastic materials as well as insulative epoxy materials. In a more specific aspect, the coating can be a nylon coating, a rubber coating or the like as will be readily apparent to those of ordinary skill in the art. The same coating techniques and coatings are applied to the termination female connectors 15 of cable assemblies 13 to be connected to the connector 11.

Having briefly described the invention, what applicant considers the invention is defined in the appended claims in a manner not intended to limiting. As will be readily apparent, other equivalent materials can be substituted as well known to those ordinary skill in the art without departing from the scope of the invention.

WHAT IS CLAIMED:

1. In a coaxial cable terminating coaxial connector of the type having a conductive outer housing for grounding the outer housing to a shield of the cable to provide shielding for conductors of the cable, the improvement wherein said connector is selectively coated on a portion of the outer housing which is exposed when the connector is connected to a coaxial cable, with a non-conductive material for preventing inadvertent electrical contact with other systems or earth grounds whereby undesired ground loops and detrimental effects on shielding are avoided.
2. A connector as in claim 1 wherein said coating is of a thickness sufficient to provide electrical insulation.
3. A connector as in claim 1 wherein said coating is of the type which has been deposited by electrostatic spraying and subsequent heat curing.
4. A connector as in claim 1 wherein said coating is of a plastic material.
5. A connector as in claim 1 wherein said coating is of an insulative epoxy material.
6. A connector as in claim 1 wherein said coating is a nylon coating.
7. A connector as in claim 1 wherein said coating is a tetrafluoroethylene polymer coating.
8. A connector as in claim 1 wherein said coating is a rubber coating.
9. A connector as in claim 1 comprising a male connector portion.
10. A connector as in claim 9 wherein said connector is a BNC-type connector.
11. A connector as in claim 1 wherein said connector is a T-shaped coaxial connector.
12. A connector as in claim 10 wherein said connector is a T-shaped coaxial connector.



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13. A connector as in claim 4 wherein said connector is a T-shaped coaxial connector.

14. A connector as in claim 13 wherein said connector is a BNC-type connector.

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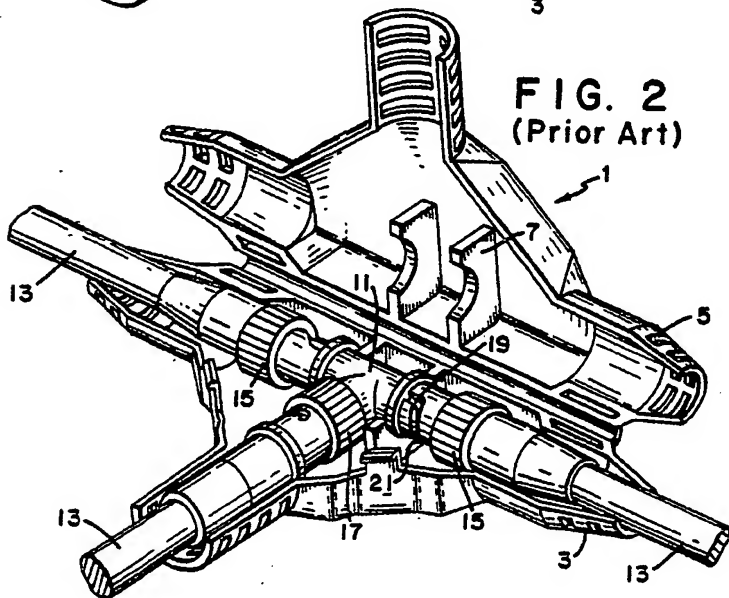
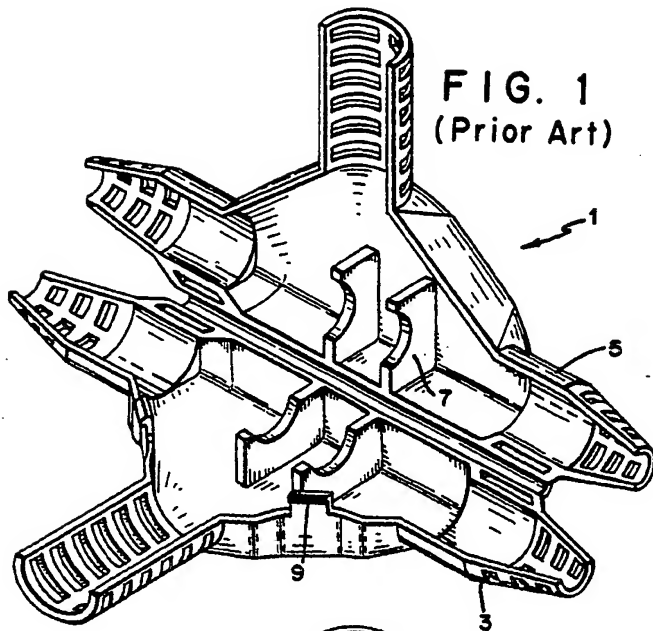
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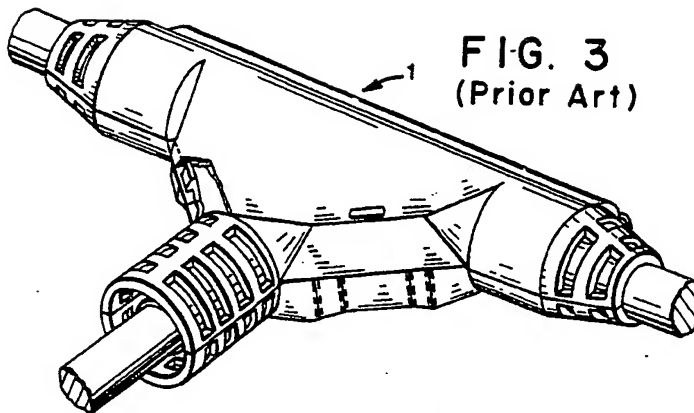
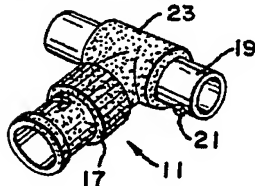
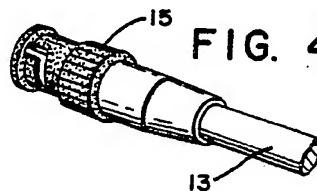
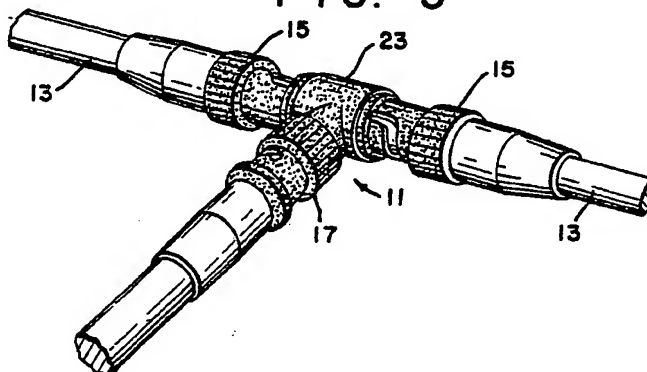
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**FIG. 3**  
(Prior Art)**FIG. 4a****FIG. 4b****FIG. 5**



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# EUROPEAN SEARCH REPORT

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Application number

EP 87 10 5176

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-1 871 397 (N.H. WATTS) * Page 3, lines 55-91; figure 6 *	1,2,8, 9,11	H 01 R 4/70 H 01 R 17/12
A		3	
X	CH-A- 520 418 (INTERLEMO) * Column 3, lines 39-57; figure 1 *	1,2,9, 11	
Y		4,5,7	
Y	EP-A-0 083 464 (PHILIPS) * Page 5, lines 17-24; figure 2 *	4,5,7	
A		1,2	
A	US-A-3 324 441 (J.A. OLSEN) * Column 2, lines 48-64; figure 2 *	3	
A,D	US-A-4 538 869 (AMP) * Column 1, lines 9-48 *	1-14	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 06-08-1987	Examiner CRIQUI J.J.
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons  &amp; : member of the same patent family, corresponding document</p>			

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